

21. Suppose that  $y$  increases exponentially with  $x$  and that  $z$  is directly proportional to the square of  $x$ . Sketch the graph of each type of function. In what ways are the two graphs similar to each other? What major graphical difference would allow you to tell which graph is which if they were not labeled?
22. Suppose that  $y$  decreases exponentially with  $x$  and that  $z$  varies inversely with  $x$ . Sketch the graph of each type of function. Give at least three ways in which the two graphs are similar to each other. What major graphical difference would allow you to tell which graph is which if they were not labeled?
23. Suppose that  $y$  varies directly with  $x$  and that  $z$  increases linearly with  $x$ . Explain why any direct variation function is a linear function but a linear function is not necessarily a direct variation function.
24. Suppose that  $y$  varies directly with the square of  $x$  and that  $z$  is a quadratic function of  $x$ . Explain why the direct-square variation function is a quadratic function but the quadratic function is not necessarily a direct-square variation function.
25. *Natural Exponential Function Problem:* Figure 2-2j shows the graph of the natural exponential function  $f(x) = 3e^{0.8x}$ . Let  $g(x) = 3b^x$ . Find the value of  $b$  for which  $g(x) = f(x)$ . Show graphically that the two functions are equivalent.

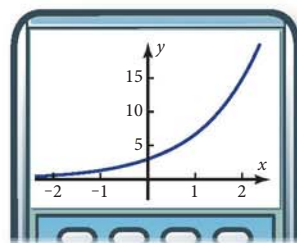


Figure 2-2j